21 ~~20.~~ (Currently Amended) The active filter of claim ~~19~~ 20 ~~22,~~ wherein each control loop generates a voltage command corresponding to a characteristic harmonic, and wherein the active filter further comprises means for summing the voltage command with a command corresponding to inverter voltage, and vector modulation logic, responsive to an output of the summing means, for controlling the inverter.

22 ~~21.~~ (Currently Amended) The active filter of claim ~~19~~ 20 ~~22,~~ wherein within each control loop, a Park vector representing capacitor bank current is transformed to a reference frame that is synchronous with respect to positional angle $(6n\pm1)\theta$ of the fundamental; the resulting synchronous vector in the m^{th} synchronous reference frame is passed through a low pass filter, which filters out all frequencies; and the filtered signal is supplied to a PI regulator, which provides the voltage command for generating the corresponding harmonic current.

20 ~~22.~~ (Currently Amended) ~~The filter of claim 19,~~ An active filter for a power distribution system, the system including a power bus and a capacitor bank shunt-connected to the power bus, the filter comprising:

an inverter;

a plurality of control loops, each control loop corresponding to a different multiple of capacitor bank Park Vector angle, each control loop causing the inverter to inject a different harmonic current into the power bus; and

~~further comprising~~ an inverter overcurrent regulator for changing gain of the control loops in inverse proportion to an increase in overcurrent.

23. (Currently Amended)The filter of claim ~~19~~ 20 ~~22,~~ further comprising a dc link capacitor coupled across the inverter, the dc link capacitor providing power to the inverter; and an inverter control for controlling the inverter to maintain the dc link capacitor at essentially a constant and stable voltage.

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24. (Currently Amended) The active filter of claim ~~19~~ 22, further comprising an inverter control for generating an inverter vector command having a zero quadrature-axis component and a direct-axis component derived from dc link capacitor voltage; and an inner loop for regulating measured inverter current according to the inverter vector command.

25. (Original) The active filter of claim 24, wherein the inverter control includes a damping loop for modifying the inner loop to damp out non characteristic oscillations on the capacitor bank; and logic for removing harmonic currents from the measured inverter current Park vector.

26. (Original) A method of using an inverter to filter harmonic currents on a power bus of a power distribution system, a capacitor bank being shunt-connected across the power bus, the method comprising:

measuring currents flowing through the capacitors of the capacitor bank; and

controlling the inverter to inject harmonic currents into the power bus in response to the measured currents so that the inverter supplies harmonic current demands of non linear loads on the power bus.

27. (Original) The method of claim 26, wherein voltage commands corresponding to multiple characteristic harmonics are generated, and wherein the voltage commands are summed with a command corresponding to inverter voltage, and wherein the inverter is vector- modulated in response to the sum.